

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A method, implemented at least in part by a computing system, of normalizing a discourse representation structure (DRS) that includes boxes with box elements and box element arguments having markers, box identifiers and data values, the method comprising:

receiving the DRS;

normalizing a form in which boxes and box elements are represented in the DRS by deleting unused boxes from the DRS;

sorting the boxes and box elements, based on the box and box element normal form and regardless of the markers, to obtain a preliminary ordering;

normalizing a form in which markers are represented in the DRS; and

sorting the boxes and box elements based on the preliminary ordering and based on the marker normal form, to generate a DRS in a normal form; and

providing an output comprising the DRS in the normal form.

2. (Canceled)

3. (Previously presented) The method of claim 1 wherein normalizing the form in which box elements are represented comprises:

deleting unused box elements from the DRS.

4. (Original) The method of claim 3 wherein normalizing the form in which boxes are represented comprises:

re-numbering the boxes with consecutive indices.

5. (Original) The method of claim 4 wherein normalizing the form in which box elements are represented comprises:

re-numbering the box elements with consecutive identifiers.

6. (Original) The method of claim 5 wherein sorting the boxes and box elements, based on the box and box element normal forms and regardless of the markers, comprises:

lexicographically ordering the boxes and box elements based on the indices and identifiers to obtain lexicographically ordered boxes and box elements.

7. (Original) The method of claim 6 wherein sorting the boxes and box elements, based on the box and box element normal forms and regardless of the markers, comprises:

updating the boxes to refer to re-numbered box elements.

8. (Original) The method of claim 7 wherein sorting the boxes and box elements, based on the box and box element normal forms and regardless of the markers, comprises:

updating the box elements to refer to re-numbered boxes.

9. (Original) The method of claim 8 wherein normalizing the form in which markers are represented in the DRS comprises:

generating a mapping between each marker and a list identifying a box and box element containing the marker.

10. (Original) The method of claim 9 wherein normalizing the form in which markers are represented in the DRS comprises:

generating an inverse mapping between the list identifying a box and box element containing a marker and each marker.

11. (Original) The method of claim 10 wherein normalizing the form in which markers are represented in the DRS comprises:

re-numbering the markers with consecutive marker values.

12. (Original) The method of claim 11 wherein normalizing the form in which markers are represented in the DRS comprises:

updating the box elements to refer to the re-numbered markers.

13. (Original) The method of claim 12 wherein sorting the boxes and box elements based on the preliminary ordering and based on the marker normal forms comprises:

sorting the lexicographically ordered boxes and box elements based on the re-numbered markers to obtain a normalized DRS.

14. (Original) The method of claim 13 and further comprising:

generating a string representative of the normalized DRS.

15. (Withdrawn) A discourse representation data structure (DRS) representative of a discourse input, the DRS comprising:

an array of boxes, each box including a set of box elements with associated arguments, the box elements and associated arguments including a semantic representation of semantic content of the discourse input.

16. (Withdrawn) The DRS of claim 15 and further comprising:

a string representative of the DRS.

17. (Withdrawn) The DRS of claim 15 and further comprising:

an integer number of boxes in the DRS indicative of a length of the array of boxes.

18. (Withdrawn) The DRS of claim 17 wherein the set of box elements is embodied as a vector of box elements and further comprising:

an integer number of box elements in the DRS indicative of a length of the vector of box elements.

19. (Withdrawn) The DRS of claim 18 and further comprising:

a vector map that includes a vector of lists of pairs of integers in the DRS; and an integer number of markers in the DRS, indicative of a length of the vector map.

20. (Withdrawn) The DRS of claim 15 wherein each box in the array of boxes comprises:  
a DRS pointer field that includes a pointer to the DRS containing the box.
21. (Withdrawn) The DRS of claim 20 wherein each box in the array of boxes comprises:  
an integer number of elements in the box.
22. (Withdrawn) The DRS of claim 21 wherein each box in the array of boxes comprises:  
a vector of element indices having a length given by the integer number of elements in  
the box.
23. (Withdrawn) The DRS of claim 15 wherein each box element in the set of box elements  
comprises:  
a kind field indicative of a kind of box element; and  
a semantic kind field indicative of a semantic kind of the box element.
24. (Withdrawn) The DRS of claim 23 wherein each box element further comprises:  
an integer number of box element arguments in the box element; and  
a vector of box element arguments in the box element, having a length indicated by the  
integer number of box element arguments.
25. (Withdrawn) The DRS of claim 24 wherein each box element further comprises:  
a string representative of the box element.
26. (Withdrawn) The DRS of claim 24 wherein each box element further comprises:  
a semantic node value indicative of a semantic node in an external semantic domain  
corresponding to the box element.
27. (Withdrawn) The DRS of claim 15 wherein each box element argument comprises:  
an argument kind field indicative of a kind of the box element argument.

28. (Withdrawn) The DRS of claim 27 wherein each box element argument comprises:  
an argument identification field including an identifier of the box element argument.
29. (Withdrawn) The DRS of claim 27 wherein each box element argument comprises:  
a data value field including a data value associated with the box element argument.